WHAT IS CLAIMED IS:

1. A method for the evaluation of the ultrastructure of connective tissue comprising:

(a) providing a fiber optic probe operative in the mid-infrared or near-infrared region of the electromagnetic spectrum,

(b) positioning the probe to be in contact with the surface of the connective tissue for detecting attenuated total reflectance or within a sufficient distance from the surface of the connective tissue for detecting reflection,

(c) detecting mid-infrared radiation or near-infrared radiation penetrating the surface of the connective tissue for detecting attenuated total reflectance or reflecting off of the surface of the connective tissue for detecting reflection, and

(d) analyzing said infrared radiation from step (c) for at least one of peak height, peak area and frequency and comparing at least one of the peak height, the peak area and the frequency to established values for at least one of peak height, peak area and frequency for normal connective tissues to detect a modification in the molecular structure of the connective tissue.

2. The method of claim 1, wherein the probe detects said infrared radiation by attenuated total reflectance.

3. The method of claim 2, wherein the analyzing step (d) is carried out by peak frequency shift analysis.

4. The method of claim 2, wherein the analyzing step (d) is carried out by peak area analysis.

5. The method of claim 2, wherein the analyzing step (d) is carried out by a combination of peak shift analysis and peak area analysis.

6. The method of claim 1, wherein the connective tissue is selected from the group consisting of articular cartilage, meniscal cartilage, ligament, tendon, capsule and bone.

7. The method of claim 1, wherein the connective tissue is a soft connective tissue.

8. The method of claim 1, wherein the connective tissue is cartilage.

9. The method of claim 1, wherein the evaluation of the ultrastructure of the connective tissue is carried out *in vivo*.

10. The method of claim 1, wherein the evaluation of the ultrastructure of the connective tissue is carried out *in vitro*.

11. The method of claim 1, wherein the probe comprises an attenuated total reflectance element through which infrared radiation is transmitted and received.

12. The method of claim 11, wherein the analyzing step (d) is carried out by peak frequency shift analysis.

13. The method of claim 11, wherein the analyzing step (d) is carried out by peak area analysis.

14. The method of claim 11, wherein the analyzing step (d) is carried out by a combination of peak frequency shift analysis and peak area analysis.

15. The method of claim 1, wherein the probe detects infrared radiation by reflection.

16. The method of claim 15, wherein the analyzing step (d) is carried out by peak frequency shift analysis.

17. The method of claim 15, wherein the analyzing step (d) is carried out by peak area analysis.

18. The method of claim 15, wherein the analyzing step (d) is carried out by a combination of peak frequency shift analysis and peak area analysis.

19. The method of claim 1, wherein the infrared radiation is near-infrared radiation.

20. The method of claim 1, wherein the infrared radiation is mid-infrared radiation.